# CLAIMS

1. A fuel cell system comprising:

a fuel cell body having an anode electrode supplied with fuel gas containing hydrogen and a cathode electrode supplied with oxidizer gas;

a catalyst degradation-suppressing device operative to interrupt supplying oxidizer gas to the cathode electrode after disconnecting an external load from the fuel cell body and allow a load current, generated by the fuel cell body, to be extracted by an internal load while supplying the fuel gas to the anode electrode;

a hydrogen supply stop device operative to interrupt a supply of the fuel gas to the anode electrode except for residual hydrogen being supplied thereto during a period in which the load current is extracted by the internal load; and

a load current control device controlling a target load current such that after the supply of fuel gas to the anode electrode is stopped, a pressure inside the anode electrode is maintained at a target pressure.

2. The fuel cell system according to claim 1, wherein catalyst degradation-suppressing device stops extracting the load current by the internal load when the target load current drops below a given value.

3. The fuel cell system according to claim 1, wherein the load current control device lowers the target pressure such that the lower the pressure inside the anode electrode, the slower will be the drop speed in the target pressure.

4. The fuel cell system according to claim 1, further comprising:

a hydrogen circulation path through which exhaust hydrogen, expelled from an outlet of the anode electrode, is circulated to an inlet of the anode electrode; and

a hydrogen circulation device by which fuel gas is circulated; and

wherein the hydrogen circulation device is actuated prior to extracting the load current by the internal load.

5. The fuel cell system according to claim 1, further comprising:

a purge valve connected to an outlet of the anode electrode; and

wherein the purge valve is opened prior to interrupting the supply of fuel gas to the anode electrode.

6. The fuel cell system according to claim 1, further comprising:

a hydrogen pressure regulator valve connected to an inlet of the anode electrode for regulating the pressure at the inlet of the anode electrode to a given pressure during the period in which the load current is extracted by the internal load.

7. The fuel cell system according to claim 6, further comprising:

a pressure sensor sensing the pressure at the inlet of the anode electrode to provide a measured pressure; and

hydrogen pressure control means responsive to the measured pressure delivered from the pressure sensor for controlling the hydrogen pressure regulator valve to allow fuel gas to be compensated by a rate consumed by the fuel cell body during the period in which the load current is extracted by the internal load.

8. The fuel cell system according to claim 1, wherein when the pressure in the anode electrode is maintained at the target pressure, the amount of residual hydrogen flowing into the anode electrode from a downstream of the hydrogen supply stop device nearly equals the amount of hydrogen consumed by the load current.

9. The fuel cell system according to claim 1, further comprising:

a pressure sensor sensing a pressure at an inlet of the anode electrode to provide a measured pressure; and

wherein the catalyst degradation-suppressing device provides the target load current based on the target pressure and the measured pressure delivered from the

pressure sensor.

10. The fuel cell system according to claim 9, wherein the catalyst degradation-suppressing device determines a first target pressure drop response pattern and a second target pressure drop response pattern that is slower in rate of response than that of the first target pressure drop response pattern whereby when the pressure in the anode electrode is below a given value, the second target pressure drop response pattern is selected to allow the load current control device to vary the target load current in accordance with the second target pressure drop response pattern.

11. The fuel cell system according to claim 1, further comprising:

dilution means connected to an outlet of the anode electrode to dilute hydrogen to be exhausted to a given concentration; and

wherein the catalyst degradation-suppressing device is operative to set a target pressure lower limit value based on a dilution capacity of the dilution means.

12. The fuel cell system according to claim 1, further comprising:

a voltage sensor detecting a given voltage of the fuel cell body to provide a detected voltage; and

wherein the catalyst degradation-suppressing device is operative to cause the hydrogen supply stop device to interrupt the supply of fuel gas to the anode electrode in response to the detected voltage.

13. A fuel cell system comprising:

a fuel cell body having an anode electrode supplied with fuel gas containing hydrogen and a cathode electrode supplied with oxidizer gas;

catalyst degradation-suppressing means for interrupting a supply of oxidizer gas to the cathode electrode after disconnecting an external load from the fuel cell body and allow a load current, generated by the fuel cell body, to be extracted by

an internal load while supplying the fuel gas to the anode electrode;

hydrogen supply stop means for interrupting a supply of fuel gas to the anode electrode except for residual hydrogen being supplied thereto during a period in which the load current is extracted by the internal load; and

load current control means for controlling a target load current such that after the supply of fuel gas to the anode electrode is stopped, a pressure inside the anode electrode is maintained at a target pressure.

14. A method of operating a fuel cell system, comprising:

providing a fuel cell body having an anode electrode supplied with fuel gas containing hydrogen and a cathode electrode supplied with oxidizer gas;

providing an internal load;

interrupting a supply of oxidizer gas to the cathode electrode after disconnecting an external load from the fuel cell body;

connecting the internal load to the fuel cell body to allow a load current to be extracted from the fuel cell body while supplying the fuel gas to the anode electrode;

interrupting a supply of the fuel gas to the anode electrode except for residual hydrogen being supplied thereto during a period in which the load current is extracted by the internal load; and

controlling a target load current such that after the supply of fuel gas to the anode electrode is interrupted, a pressure inside the anode electrode is maintained at a target pressure.